

# FM 4-19

## WAR DEPARTMENT FIELD MANUAL

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# COAST ARTILLERY EXAMINATIONS FOR GUNNERS

**RESTRICTED**—DISSEMINATION OF RESTRICTED MATTER.  
The information contained in restricted documents and the essential characteristics of restricted material may be given to any person known to be in the service of the United States and to persons of undoubted loyalty and discretion who are cooperating in Government work, but will not be communicated to the public or to the press except by authorized military public relations agencies. (See also par. 23b, AR 380-5, 15 Mar 1944.)

WAR DEPARTMENT • 15 MAY 1944

WAR DEPARTMENT FIELD MANUAL  
FM 4-19

*This manual supersedes so much of FM 4-150, 20 May 1941,  
as pertains to seacoast artillery.*

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*Army Field Printing Plant  
The Coast Artillery School  
Fort Monroe, Va.*

WAR DEPARTMENT,  
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BY ORDER OF THE SECRETARY OF WAR:

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For explanation of symbols, see FM 21-6.

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*This manual supersedes so much of FM 4-150, 20 May 1941, as pertains to seacoast artillery.*

## CHAPTER 1

### GENERAL

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**1. OBJECT OF EXAMINATIONS.** The object of examinations for gunners is to test enlisted men for qualification in the use of their principal arm as designated in AR 775-10; to furnish a basis for their classification as gunners; to provide a basis for further instruction; and to encourage others, authorized herein to take the examinations, by giving them an opportunity to qualify as gunners.

**2. CLASSIFICATION OF GUNNERS.** Based upon the scope of the examination and the percentage obtained, gunners will be divided into three classes: second-class, first-class, and expert. The qualifying mark for second-class gunner will be not less than 75 percent, for first-class gunner not less than 85 percent, and for expert gunner not less than 90 percent. The scope of the several examinations is stated in chapter 3.

**3. ELIGIBILITY OF CANDIDATES.** a. The following personnel are eligible to take the examinations:

- (1) Enlisted men of the Coast Artillery Corps.
- (2) Enlisted men of the Detached Enlisted Men's List whose duties require them to maintain proficiency in coast artillery subjects.
- (3) Cadets of the United States Military Academy.
- (4) Members of the Coast Artillery Reserve Officers' Training Corps.
- (5) Enlisted men of the National Guard of Coast Artillery units.

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*Note.* For definitions of military terms not defined in this manual, see TM 20-205.

b. Candidates must have received a proper course of instruction.

c. Candidates for first-class gunner must have previously qualified as second-class gunner, and candidates for expert gunner must have previously qualified as first-class gunner. However, all qualifications may be made during the same examination period.

**4. REQUALIFICATION.** a. Enlisted men qualifying during periods when additional compensation is authorized, may retain classification for a period of 18 months or until reexamination, whichever comes first. The retained classification may be carried into a new enlistment, providing the qualified enlisted men reenlist in the same unit within 20 days from the date of discharge and within 18 months of the date of qualification. During periods when additional pay is not authorized, first-class or expert gunners may elect to retain their classification during the current enlistment without requalifying.

b. Failure to pass a reexamination for classification terminates a classification attained at any previous examination for the same classification. It does not terminate a lower classification or an equal classification based on a different specialty.

c. Requalification will be required upon a change of principal arm.

d. Enlisted men holding a classification as first-class or expert gunner will not be required to requalify in a lower rating of the same principal arm or specialty. A second-class gunner will not be required to requalify as such in the same principal arm during his current enlistment.

e. Persons, other than enlisted men of the Army of the United States, who qualify as gunners under the provisions of this manual may retain classification until they become members of the Army of the United States and have been afforded an opportunity to requalify.

**5. ADDITIONAL COMPENSATION.** Only enlisted men of the Coast Artillery Corps and enlisted men of the Detached Enlisted Men's List whose duties require them to maintain proficiency in coast artillery subjects are eligible to draw additional compensation. (See AR 35-2380.)



6. **GUNNERS' BADGES.** See AR 600-35, 600-40, and 600-75.

7. **CHARACTER OF EXAMINATIONS.** The instructing and examining of gunners will be directed toward preparing enlisted men better to perform their combat artillery duties. Examinations will be in sufficient detail to distinguish between superficially prepared candidates and the men who, by conscientious study, have materially increased their value to the service. Oral or written examinations will, if given, be secondary to practical demonstration. **Practical demonstrations must be required in all cases except where it is manifestly impossible to do so.** Expert gunners, in addition to exhibiting practical ability, must demonstrate considerable knowledge of theory and the ability to instruct others.

8. **INSTRUCTION.** Unit commanders are responsible for seeing that candidates are properly instructed in the prescribed subjects prior to appearing before the examining board.

9. **REFERENCES ON INSTRUCTION.** As general references, see FM 21-5, *Military Training*; TM 21-250, *Army Instruction*; and FM 21-8, *Military Training Aids*. For specific references, see FM 21-6, *List of Publications for Training*, and FM 21-7, *List of Training Films, Film Strips, and Film Bulletins*. Gunners' instruction manuals, listed below, should be supplemented by reference to the appropriate Field Manual, Technical Manual, other available training literature, and all training aids.

TM 4-305—Coast Artillery Gunners' Instruction, Fixed Seacoast Artillery, First and Second Class Gunners.

TM 4-310—Coast Artillery Gunners' Instruction, Fixed Seacoast Artillery, Expert Gunners.

TM 4-315—Coast Artillery Gunners' Instruction, Mobile Seacoast Artillery, First and Second Class Gunners.

TM 4-320—Coast Artillery Gunners' Instruction, Mobile Seacoast Artillery, Expert Gunners.

## CHAPTER 2

### BOARDS OF EXAMINATION

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**10. BY WHOM CONVENED.** Boards will be convened by separate battery, battalion, or higher commanders for the examination of members of their command. Candidates who are not members of the command of the convening authority, and for whom no provision for examination has been made, will be examined upon application. If found qualified, they will be announced as gunners by the convening authority. Normally, examinations will be held annually. At the discretion of the convening authority, boards may be appointed at any time to conduct supplementary examinations.

**11. COMPOSITION OF BOARDS.** Boards will consist of at least three coast artillery officers. So far as practicable, the members of the board will be from units other than those to which the candidates are assigned. If three coast artillery officers are not available, application will be made to the next higher headquarters for the convening of the board.

**12. WHERE HELD.** Examinations will be held at such places as the materiel pertaining to the subject is located.

**13. RECORDS AND REPORTS.** See AR 345-1000.

## CHAPTER 3

### SCOPE OF EXAMINATIONS

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#### Section I. GENERAL

**14. EXAMINATIONS.** The examinations taken by candidates will be those prescribed for the types of unit to which they are assigned or attached. Candidates not on duty with a coast artillery unit may elect to take any one of the authorized examinations. After qualifying as expert gunner in any primary specialty, candidates may, at the discretion of the board, take other prescribed examinations providing the candidates have received the proper instruction.

**15. CANDIDATES NOT MEMBERS OF THE ARMY OF THE UNITED STATES.** These candidates may, with the approval of the senior tactical coast artillery officer, either commanding or in charge of instruction, elect to take any one of the prescribed examinations.

**16. ARMAMENT ON WHICH EXAMINED.** In general, those parts of any examination requiring a knowledge of armament should be based principally on the primary weapon of the unit. If additional weapons are manned by the unit as a secondary assignment, these weapons should also be included in the examination. In the case of individual enlisted men whose primary duty is on the secondary armament of the unit, the examination should be based principally on these weapons rather than on the principal arm. The discretion of the board and local commanders should be exercised to insure a suitable and adequate examination on weapons.

## Section II. FIXED BATTERIES, HARBOR DEFENSE

### Part 1—Primary Armament

**17. SECOND-CLASS GUNNER.** Candidates for second-class gunner will be examined on the following subjects:

**a. Service of the piece.** This part of the examination will consist of actual drill during which candidates will perform the duties of such members of the gun section as the board may direct. 30

**b. Gun and carriage.** The steps in this section of the examination will include the testing of the candidates' general knowledge of automatic weapons of .50 caliber or greater, if such weapons are issued to or manned by the battery. 30

(1) Nomenclature.

(2) Functioning of parts.

(3) Care and minor adjustments.

(4) Painting and use of lubricants.

(5) Safety precautions.

**c. Ammunition.**

15

(1) Projectiles.

(2) Powders.

(3) Fuzes.

(4) Primers.

(5) Storage, handling, and safety precautions.

**d. Small arms.** The examination will cover small arms of .45 caliber or less. 20

(1) Nomenclature.

(2) Use, care, and adjustment.

(3) Ammunition.

(4) Safety precautions.

**e. Cordage and mechanical maneuvers.**

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**18. FIRST-CLASS GUNNER.** Candidates for first-class gunner will be examined on the following subjects:

**a. Duties of range section.** During actual drill, candidates will be required to perform duties of such members of the range section as the board may direct. 20

|   |           |
|---|-----------|
| <b>b. Orientation, use, and adjustment of observation instruments.</b>  | 15        |
| Includes a general knowledge of radar if it is employed by the battery. |           |
| <b>c. Pointing methods and instruments.</b>                             | 10        |
| <b>d. Elementary definitions pertaining to seacoast artillery.</b>      | 10        |
| <b>e. Recognition of aerial and water targets.</b>                      | 10        |
| <b>f. Use and care of telephones or radio.</b>                          | 15        |
| (1) Sending, receiving, and recording messages. (Voice only for radio.) |           |
| (2) Installation, use, and tests of field telephone systems.            |           |
| <b>g. Tactical organization of the harbor defense.</b>                  | 10        |
| <b>h. Basic map reading.</b>  | 10        |
|   | <hr/> 100 |

**19. EXPERT GUNNER.** Candidates for expert gunner will be required to take one of the four following examinations:

**a. Duties of chief of section, gun commander, and gun pointer.**

(1) Definitions and elementary principles of seacoast artillery. 10

(2) Gun and carriage. 25

(a) Detailed knowledge of the functioning of parts.

(b) Inspection and maintenance, including care, dismantling, cleaning, painting, and adjustment of the several parts.

(c) Safety precautions.

(d) Gun drill.

(3) Ammunition. 10

(a) Storage and care.

(b) Preparation of powder charges for firing.

(c) Preparation of projectiles for firing.

(d) Safety precautions.

(4) Ability as an instructor. 10

(5) Preparation for subcaliber and service firing, including safety precautions. 15

(6) Pointing. 15

(a) Methods and checks.

(b) Boresighting and orientation.

(c) Adjustment of sight and quadrant.

|   |           |
|---|-----------|
| (7) Materiel records and records during firing.   | 5         |
| (8) Organization of a position.   | 10        |
| (a) Camouflage and camouflage discipline.   |           |
| (b) Protection against raids, sabotage, and low-flying aircraft.  |           |
| (c) Cover and construction of shelter.  |           |
|   | <hr/> 100 |
| <b>b. Duties of plotter.</b>  |           |
| (1) Definitions and elementary principles of seacoast artillery.  | 10        |
| (2) Position finding.   | 15        |
| (a) Systems and theory.   |           |
| (b) Detailed knowledge of the system used in the battery.   |           |
| (c) Alternate systems.  |           |
| (3) Position-finding apparatus, including detailed knowledge of the use, operation, and adjustment of all the position-finding apparatus in the plotting room.        | 20        |
| (4) Ability as an instructor.   | 10        |
| (5) Elementary gunnery.   | 20        |
| (a) Explanation of the corrections applied to the observed range and deflection.  |           |
| (b) Interpretation and application of the meteorological message.   |           |
| (c) Use of firing tables.   |           |
| (6) Spotting and fire adjustment.   | 15        |
| (a) Methods and theory.   |           |
| (b) Detailed knowledge of the systems used in the battery.  |           |
| (7) Preparation of reports, including those necessary for an analysis of target practice or drill.  | 10        |
|   | <hr/> 100 |
| <b>c. Duties of observer.</b>   |           |
| (1) Definitions and elementary principles of seacoast artillery.  | 10        |
| (2) Position finding.   | 15        |
| (a) Systems and theory.   |           |
| (b) Detailed knowledge of the system used in the battery.   |           |
| (c) Alternate systems.  |           |
| (3) Observation apparatus, including a detailed knowledge of the operation, adjustment, use, and care of all observation and range-finding instruments in the battery | 20        |

except radar. Radar operators must demonstrate a detailed knowledge of the operation, adjustment, use, and care of the radar instrument used in the battery.

|   |           |
|---|-----------|
| (4) Spotting and fire adjustment.   | 15        |
| (a) Methods and theory.   |           |
| (b) Detailed knowledge of the systems in use in the battery.  |           |
| (5) Organization of a position.   | 10        |
| (a) Camouflage and camouflage discipline.   |           |
| (b) Protection against raids, sabotage, and low-flying aircraft.  |           |
| (c) Cover and the construction of shelter.  |           |
| (6) General duties of observers in observation stations.  | 10        |
| (7) Recognition of aerial and water targets; knowledge of local water areas, channels, and ranges to prominent landmarks in the harbor. | 10        |
| (8) Ability as an instructor.   | 10        |
|   | <hr/> 100 |

#### **d. Duties of communication sergeant.**

|   |    |
|---|----|
| (1) Systems of communication, including all types of military telephones and switchboards, and power and telephone lines.           | 20 |
| (2) Elementary principles of electricity and magnetism.   | 10 |
| (3) Visual signaling.   | 10 |
| (a) International flag hoists.  |    |
| (b) Semaphore.  |    |
| (c) Blinker.  |    |
| (d) Pyrotechnics.   |    |
| (e) Panels.   |    |
| (4) Time-interval devices, including general principles and a detailed knowledge of the time-interval system in use in the battery. | 15 |
| (5) Location and repair of faults in phones, lines, and cables.   | 10 |
| (6) Message center.   | 10 |
| (a) Organization.   |    |
| (b) Handling of messages.   |    |
| (c) Coding and decoding.  |    |
| (7) Ability as an instructor.   | 10 |

|  |     |
|--|-----|
| (8) Detailed knowledge of common battery equipment and communication net, including location of wires, cables, switchboards, power plants, and transformers. | 15  |
|  | 100 |

## Part 2—Automatic Weapons Section

**20. GENERAL.**—In addition to the principal arm, some units may also man automatic weapons as a secondary assignment. Enlisted men whose primary duty is in the automatic weapons section should be examined in detail on these weapons and in general on the primary armament. It will be noted that the examinations for the principal arm also include a general knowledge of the automatic weapons issued to or manned by the battery. In justice to the enlisted man, commanding officers and examining boards should use discretion in deciding which examination to give him and upon which weapons to place the emphasis.

**21. SECOND-CLASS GUNNER AND FIRST-CLASS GUNNER.** Candidates for second-class gunner and first-class gunner will take the examinations prescribed for the principal arm except that automatic weapons will be covered in detail and the primary armament in general.

**22. EXPERT GUNNER.** The expert gunner in an automatic weapons section has one specialty, that of chief of section. The examination for that specialty follows:

**a. Definitions and elementary principles of sea-coast artillery.** 10

**b. Gun and carriage.** 25

(1) Detailed knowledge of functioning of parts.

(2) Inspection and maintenance, including care, dismantling, cleaning, painting, and adjustment of the service parts.

(3) Emplacement; withdrawal from position; movement.

(4) Safety precautions.

**c. Ability as an instructor.** 10

**d. Selection and organization of a position.** 10

(1) Selection of position.



|   |           |
|---|-----------|
| (2) Camouflage and camouflage discipline.                         |           |
| (3) Protection against raids, sabotage, and low-flying airplanes. |           |
| (4) Cover and construction of shelter.                            |           |
| <b>e. Preparation for firing.</b>                                 | 10        |
| <b>f. Map reading.</b>  | 15        |
| (1) Scales, contours, and conventional signs.                     |           |
| (2) Location of a position by coordinates.                        |           |
| (3) Ability to follow routes indicated on a map.                  |           |
| <b>g. Fire-control methods and equipment.</b>                     | 15        |
| <b>h. Ammunition.</b>   | 5         |
|   | <hr/> 100 |

### Section III. MINE BATTERIES, HARBOR DEFENSE

**23. SECOND-CLASS GUNNER.** Candidates for second-class gunner will be examined on the following subjects:

|   |    |
|---|----|
| <b>a. Duties on the water, with exception of electrical tests.</b>                                    | 30 |
| <b>b. Nomenclature and care of mine materiel.</b>   | 20 |
| <b>c. Explosives (TNT) and fuzes (detonators), including safety regulations and care in handling.</b> | 10 |
| <b>d. Cordage and mechanical maneuvers.</b>   | 10 |
| <b>e. Cable joints and connections.</b>   | 15 |
| <b>f. Small arms.</b> This part of the examination will cover all small arms issued to the battery.   | 15 |
| (1) Nomenclature.   |    |
| (2) Use, care, and adjustment.  |    |
| (3) Ammunition.   |    |
| (4) Safety precautions.   |    |

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**24. FIRST-CLASS GUNNER.** Candidates for first-class gunner will be examined on the following subjects:

|  |    |
|--|----|
| <b>a. Duties of range section.</b> Candidates will be required, during actual drill, to perform the duties of such members of the range section as the board may direct. | 20 |
| <b>b. Orientation, use, and adjustment of observation instruments, including a general knowledge of use of radar if used in the battery.</b>                             | 10 |

|  |           |
|--|-----------|
| <b>c. Duties in loading room; safety regulations and precautions in handling explosives.</b>   | 15        |
| <b>d. Use and care of telephones or radio.</b>   | 15        |
| (1) Sending, receiving, and recording messages. (Voice only for radio.)  |           |
| (2) Installation, use, and tests of field telephone systems.   |           |
| <b>e. General knowledge of duties of each section of mine battery in care, operation, and maintenance of mine equipment except casemate control apparatus.</b> | 10        |
| <b>f. Definitions pertaining to seacoast artillery.</b>  | 10        |
| <b>g. Recognition of aerial and water targets.</b>   | 10        |
| <b>h. Tactical organization of the harbor defense.</b>   | 10        |
|  | <hr/> 100 |

**25. EXPERT GUNNER.** Candidates for expert gunner will be required to take one of the seven examinations listed below:

**a. Duties of casemate electrician.**

|  |           |
|--|-----------|
| (1) Definitions and elementary principles of seacoast artillery.   | 10        |
| (2) Casemate apparatus.  | 35        |
| (a) Detailed knowledge of the operation and functioning of the casemate apparatus.   |           |
| (b) Inspection, care, and maintenance.   |           |
| (3) Troubles and corrective action, including testing and repair of circuits, telephones, lamps and bells, switches, meters, engines, motors, generators, transformers, and storage batteries. | 30        |
| (4) Firing methods.  | 15        |
| (a) Controlled.  |           |
| (b) Influenced.  |           |
| (5) Ability as an instructor.  | 10        |
|  | <hr/> 100 |

**b. Duties of chief planter.**

|  |    |
|--|----|
| (1) Definitions and elementary principles of seacoast artillery.   | 10 |
| (2) Detailed knowledge of the equipment aboard the planter used in connection with any phase of mine work. | 20 |
| (3) Procedure and equipment. Candidates will be required to demonstrate detailed knowledge of procedure    | 30 |

aboard the planter in laying out a mine field; in planting, picking up, repairing, and replacing mines; and in laying shore cable.

|   |           |
|---|-----------|
| (4) Operation and use of mine yawls in all phases of mine work. | 10        |
| (5) Duties of D.B. boat detail except coxswain.                 | 10        |
| (6) Ability as an instructor.                                   | 10        |
| (7) Safety precautions on the water and action in emergencies.  | 10        |
|   | <hr/> 100 |

**c. Duties of chief loader.**

|   |           |
|---|-----------|
| (1) Definitions and elementary principles of seacoast artillery.            | 10        |
| (2) Explosives, not including powder.                                       | 10        |
| (a) Storage and handling.   |           |
| (b) Safety precautions.   |           |
| (3) Fuzes (detonators).   | 10        |
| (a) Description, storage, and handling.                                     |           |
| (b) Tests.  |           |
| (c) Preparation for use.  |           |
| (4) Loading room duties.  | 30        |
| (a) Detailed knowledge of the operation and handling of the equipment used. |           |
| (b) Assembly, loading, and testing of submarine mines.                      |           |
| (c) Delivery of mines ready for planting to the planter.                    |           |
| (d) Records.  |           |
| (5) Disassembly and unloading of mines.                                     | 20        |
| (6) Disposal of explosives.   | 10        |
| (7) Ability as an instructor.   | 10        |
|   | <hr/> 100 |

**d. Duties of observer.**

|  |    |
|--|----|
| (1) Definitions and elementary principles of seacoast artillery. | 10 |
| (2) Position finding.  | 20 |
| (a) Systems and theory.  |    |
| (b) Detailed knowledge of the system in use in the battery.      |    |
| (c) Alternate systems.   |    |

(3) Position-finding apparatus. Candidates must demonstrate detailed knowledge of the operation, adjustment, use, and care of all observation instruments used in the battery except radar. Radar operators must demonstrate a detailed knowledge of the operation, adjustment, use, and care of the radar instrument used in the battery. 15

(4) Organization of a position. 10

(a) Camouflage and camouflage discipline.

(b) Protection against raids, sabotage, and low-flying aircraft.

(c) Cover and construction of shelters.

(5) Spotting and fire adjustment. 15

(a) Systems and theory.

(b) Detailed knowledge of the systems in use in the battery.

(6) General duties of observers in observation stations. 10

(7) Recognition of aerial and water targets; knowledge of water areas, channels, local shipping, and ranges to prominent landmarks. 10

(8) Ability as an instructor. 10  
100

**e. Duties of plotter.**

(1) Definitions and elementary principles of seacoast artillery. 10

(2) Position finding. 20

(a) Systems and theory.

(b) Detailed knowledge of the system in use in the battery.

(c) Alternate systems.

(3) Position-finding apparatus. Candidates must demonstrate detailed knowledge of the use, adjustment, and operation of all the fire-control apparatus in the plotting room. 20

(4) Ability as an instructor. 10

(5) Mine fields. 15

(a) Laying out, locating, and plotting each element of a mine field.

(b) Details of the conduct of observation fire.

(6) Action of the plotting room in coordinating the 15  
operations of the mine flotilla with shore installations.

(7) Records, including those necessary to analyze drill, 10  
target practice, and combat firing. 100

**f. Duties of coxswain.**

(1) Definitions and elementary principles of seacoast 10  
artillery.

(2) Detailed knowledge of the use, care, maintenance, 25  
and operation of all the equipment on the D.B. boat.

(3) Planting of mines. 35

(a) Duties of the master of the D.B. boat when laying  
out mine field; planting, repairing, and picking up mines;  
and laying shore cable.

(b) Operation and care of mine yawls.

(c) Elementary navigation, including nautical instru-  
ments, aids, and rules of the road; local waters.

(4) Ability as an instructor. 10

(5) Safety precautions on the water and action in 10  
emergencies.

(6) Knowledge of cable connections, joints, and tests. 10  
100

**g. Duties of D.B. boat engineer.**

(1) Definitions and elementary principles of seacoast 10  
artillery.

(2) Detailed knowledge of the use, care, maintenance, 30  
and operation of all engine-room machinery and equipment.

(3) Detailed knowledge of deck machinery peculiar to 10  
D.B. boats.

(4) Detailed knowledge of electrical lay-out and con- 10  
nections, and ability to make minor repairs thereto.

(5) Types and uses of lubricants and fuels. 10

(6) Detailed knowledge of paints and their proper use in 10  
the engine room.

(7) Safety precautions, fire-fighting equipment, and 10  
methods.

(8) Ability as an instructor. 10  
100

## Section IV. 155-MM GUN BATTERIES

### Part 1—Primary Armament

**26. SECOND-CLASS GUNNER.** Candidates for second-class gunner will be examined on the following subjects:

**a. Service of the piece.** This part of the examination 25  
will include actual drill, march order, and emplacement, during which candidates will be required to perform the duties of such members of the gun section as the board may direct.

**b. Gun and carriage.** The steps in this section of the 25  
examination will include the testing of the candidates' general knowledge of automatic weapons of .50 caliber or greater, if such weapons are issued to or manned by the battery.

- (1) Nomenclature.
- (2) Functioning of parts.
- (3) Care and minor adjustments.
- (4) Painting and use of lubricants.
- (5) Safety precautions.

**c. Ammunition.** 10

- (1) Powders.
- (2) Fuzes.
- (3) Projectiles.
- (4) Primers.
- (5) Storage, handling, and safety precautions.

**d. Cordage and mechanical maneuvers.** 10

**e. Small arms.** This will cover small arms of .45 caliber 15  
or less, if such weapons are issued to the battery.

- (1) Nomenclature.
- (2) Use, care, and adjustment.
- (3) Ammunition.
- (4) Safety precautions.

**f. Motor transportation.** 15

- (1) Nomenclature.
- (2) Practical operation of motor vehicles including driv-  
ing and refueling. 100

**27. FIRST-CLASS GUNNER.** Candidates for first-class gun-  
ner will be examined on the following subjects:

|  |     |
|--|-----|
| <b>a. Duties of range section.</b>   | 20  |
| during actual drill, to perform the duties of such members of the range section as the board may direct.   |     |
| <b>b. Orientation, use, and adjustment of observation instruments, including a general knowledge of use of radar if employed by the battery.</b> | 10  |
| <b>c. Pointing methods and instruments.</b>  | 10  |
| <b>d. Use and care of telephones or radio.</b>   | 10  |
| (1) Sending, receiving, and recording messages. (Voice only for radio.)  |     |
| (2) Installation, use, and tests of field telephone systems.   |     |
| <b>e. Basic map reading.</b>   | 10  |
| <b>f. Definitions pertaining to seacoast artillery.</b>  | 10  |
| <b>g. Recognition of aerial and water targets.</b>   | 10  |
| <b>h. Motor transportation.</b>  | 10  |
| (1) Duties of the driver in maintenance, trouble shooting, and minor repairs.  |     |
| (2) Convoy rules and discipline.   |     |
| (3) Operation of motor vehicles under adverse conditions.  |     |
| <b>i. Tactical organization of the harbor defense.</b>   | 10  |
|  | 100 |

**28. EXPERT GUNNER.** Candidates for expert gunner will be required to take one of the five following examinations:

**a. Duties of chief of section, gun commander, and gun pointer.**

- |  |    |
|--|----|
| (1) Definitions and elementary principles of seacoast artillery.   | 10 |
| (2) Gun and carriage.  | 20 |
| (a) Detailed knowledge of the functioning of the several parts.  |    |
| (b) Inspection and maintenance, including care, dismantling, cleaning, painting, and adjustment of the several parts.                  |    |
| (c) Gun drill.   |    |
| (d) Occupation of and withdrawal from position.  |    |
| (e) Maneuvering, including the various methods of moving the gun into position, using cordage, tackles, jacks, manpower, and tractors. |    |

|  |           |
|--|-----------|
| (f) Safety precautions.  |           |
| (3) Ability as an instructor.  | 10        |
| (4) Organization of a position.  | 10        |
| (a) Camouflage and camouflage discipline.  |           |
| (b) Protection against raids, sabotage, and low-flying aircraft.   |           |
| (c) Cover and the construction of shelter.   |           |
| (5) Ammunition.  | 10        |
| (a) Storage and care.  |           |
| (b) Preparation of powder charges for firing.  |           |
| (c) Preparation of projectiles for firing.   |           |
| (d) Safety precautions.  |           |
| (6) Preparation for subcaliber and service firing, including safety precautions.   | 10        |
| (7) Pointing.  | 10        |
| (a) Methods and pointing checks.   |           |
| (b) Boresighting and orientation.  |           |
| (c) Adjustment of sight, aiming rule, and quadrant.  |           |
| (8) Map reading.   | 10        |
| (a) Scales, contours, and conventional signs.  |           |
| (b) Location of a position by coordinates.   |           |
| (c) Ability to follow routes indicated on a map.   |           |
| (d) Ability to determine data pertaining to roads, bridges, fords, grades, and swamps.   |           |
| (9) March rules and discipline.  | 10        |
|  | <hr/> 100 |
| <b>b. Duties of plotter.</b>   |           |
| (1) Definitions and elementary principles of seacoast artillery.   | 10        |
| (2) Position finding.  | 20        |
| (a) Systems and theory.  |           |
| (b) Detailed knowledge of the system in use in the battery.  |           |
| (c) Alternate systems.   |           |
| (3) Position-finding apparatus, including detailed knowledge of the adjustment, care, and operation of all position-finding apparatus used in the plotting room. | 15        |
| (4) Ability as an instructor.  | 10        |
| (5) Elementary gunnery.  | 15        |



|  |     |
|--|-----|
| (a) Explanation of the several corrections applied to the observed range and deflection.   |     |
| (b) Interpretation and application of the meteorological message.  |     |
| (c) Use of firing tables.  |     |
| (6) Map reading.   | 10  |
| (a) Scales, contours, and conventional signs.  |     |
| (b) Location of a position by coordinates.   |     |
| (7) Spotting and fire adjustment.  | 10  |
| (a) Systems and theory.  |     |
| (b) Detailed knowledge of the systems in use in the battery.   |     |
| (8) Preparation of necessary reports for analysis of drill or target practice.   | 10  |
|  | 100 |
| <b>c. Duties of instrument sergeant or observer.</b>   |     |
| (1) Definitions and elementary principles of seacoast artillery.   | 5   |
| (2) Position finding.  | 15  |
| (a) Systems and theory.  |     |
| (b) Detailed knowledge of the system in use in the battery.  |     |
| (c) Alternate systems.   |     |
| (3) Position-finding apparatus, including detailed knowledge of the operation, adjustment, use, and care of all observation and range-finding instruments in use in the battery except radar. Radar operators must demonstrate a detailed knowledge of the operation, adjustment, use, and care of the radar instrument used in the battery. | 15  |
| (4) Spotting and fire adjustment.  | 10  |
| (a) Systems and theory.  |     |
| (b) Detailed knowledge of the systems in use in the battery.   |     |
| (5) Map reading.   | 10  |
| (a) Scales, contours, and conventional signs.  |     |
| (b) Location of a position by coordinates.   |     |
| (c) Ability to follow a route indicated on a map.  |     |
| (6) Duties of an assistant transitman in locating the individual guns or the directing point of a battery.   | 10  |
| (7) Organization of a position.  | 10  |

|  |           |
|--|-----------|
| (a) Camouflage and camouflage discipline.  |           |
| (b) Protection against raids, sabotage, and low-flying aircraft.   |           |
| (c) Cover and construction of shelters.  |           |
| (8) General duties of observers in observation stations.   | 5         |
| (9) Recognition of targets; general knowledge of local shipping, channels, and prominent landmarks in the field of fire. | 10        |
| (10) Ability as an instructor.   | 10        |
|  | <hr/> 100 |

**d. Duties of communication sergeant.**

|  |           |
|--|-----------|
| (1) Systems of communication, including detailed knowledge of all types of military telephones, switchboards, and power and telephone lines.   | 20        |
| (2) Elementary principles of electricity and magnetism.  | 10        |
| (3) Visual signaling.  | 5         |
| (a) International flag hoists.   |           |
| (b) Semaphore.   |           |
| (c) Blinker.   |           |
| (d) Pyrotechnics.  |           |
| (e) Panels.  |           |
| (4) Installation of the field telephone system used by the battery, including utilization of the natural features of the ground and of the artificial methods for concealing and protecting cables, wires, and switchboards. | 20        |
| (5) Time-interval devices, including detailed knowledge of their installation and operation.   | 15        |
| (6) Location of faults; tests for grounds and short circuits in wires and cables.  | 10        |
| (7) Message center.  | 10        |
| (a) Organization.  |           |
| (b) Handling of messages.  |           |
| (c) Coding and decoding.   |           |
| (8) Ability as an instructor.  | 10        |
|  | <hr/> 100 |

**e. Duties of transportation sergeant.**

|   |    |
|---|----|
| (1) Internal combustion engines, including an understanding of their operating principles; a detailed knowledge | 15 |
|---|----|

of their care, service, and repair; and the functioning of their component parts, units, and systems.

(2) Inspection and maintenance of transmission gears, 20  
differentials, cooling systems, and storage batteries; inspection, maintenance, and adjustment of clutches, brakes, spark plugs, electrical systems, carburetors, valves, governors, and steering mechanisms. Candidates must also demonstrate detailed knowledge of the use and care of the mechanic's tools issued to the organization.

(3) Elementary principles of electricity and magnetism. 10

(4) Shop practice; supervision and instruction of mechanics. 10

(5) Loads and their proper distribution. 5

(6) Training of drivers. 10

(7) Detailed knowledge of the rules of the road, convoy regulations and discipline, speed laws and regulations, parking, and road inspections. 10

(8) Motor transportation records and reports. 10

(9) Ability as an instructor. 10

---

100

## **Part 2—Automatic Weapons Section**

**29. GENERAL.** See paragraph 20.

**30. SECOND-CLASS GUNNER AND FIRST-CLASS GUNNER.** These examinations will be the same as the examinations prescribed for the principal arm except that the automatic weapons will be covered in detail and the primary armament in general.

**31. EXPERT GUNNER.** See paragraph 28.

## **Section V. RAILWAY BATTERIES**

### **Part 1—Primary Armament**

**32. SECOND-CLASS GUNNER.** Candidates for second-class gunner will be examined on the following subjects:

**a. Service of the piece.** This will include actual drill 25  
and emplacement, during which the candidates will be  
required to perform the duties of such members of the gun  
section as the board may direct.

**b. Gun and carriage.** The steps in this part of the 25  
examination will include the testing of the candidates'  
general knowledge of automatic weapons of .50 caliber  
or greater issued to or manned by the battery.

- (1) Nomenclature.
- (2) Functioning of parts.
- (3) Care and minor adjustments.
- (4) Painting and use of lubricants.
- (5) Safety precautions.

**c. Ammunition.** 10

- (1) Powders.
- (2) Primers.
- (3) Fuzes.
- (4) Projectiles.
- (5) Storage, handling, and safety precautions.

**d. Cordage and mechanical maneuvers.** 10

**e. Small arms.** This will include small arms of .45 15  
caliber or less issued to the battery.

- (1) Nomenclature.
- (2) Use, care, and adjustment.
- (3) Ammunition.
- (4) Safety precautions.

**f. Track materiel.** 15

- (1) Nomenclature of track materiel.
  - (2) Packing of journal boxes, brake mechanisms, buffers,  
couplings.
- 

**33. FIRST-CLASS GUNNER.** Candidates for first-class gun-  
ner will be examined on the following subjects:

**a. Duties of the range section.** Candidates will be 20  
required, during actual drill, to perform the duties of such  
members of the range section as the board may direct.

**b. Orientation, use, and adjustment of observation** 15  
**instruments, including a general knowledge of use**  
**of radar if employed by the battery.**

**c. Pointing methods and instruments.** 10

|  |     |
|--|-----|
| <b>d. Use and care of telephones or radio.</b>                             | 15  |
| (1) Sending, receiving, and recording of messages. (Voice only for radio.) |     |
| (2) Installation, use, and tests of field telephone systems.               |     |
| <b>e. Elementary definitions pertaining to seacoast artillery.</b>         | 10  |
| <b>f. Recognition of aerial and water targets.</b>                         | 10  |
| <b>g. Basic map reading.</b>   | 10  |
| <b>h. Tactical organization of harbor defense.</b>                         | 10  |
|  | 100 |

**34. EXPERT GUNNER.** Candidates for expert gunner will be required to take one of the five following examinations:

|   |    |
|---|----|
| <b>a. Duties of plotter.</b> See paragraph 28b.   |    |
| <b>b. Duties of instrument sergeant or observer.</b> See paragraph 28c.                                   |    |
| <b>c. Duties of communication sergeant.</b> See paragraph 28d.  |    |
| <b>d. Duties of chief of section, gun commander, and gun pointer.</b>                                     |    |
| (1) Definitions and elementary principles of seacoast artillery.  | 10 |
| (2) Gun and carriage.   | 15 |
| (a) Detailed knowledge of the functioning of parts.   |    |
| (b) Inspection and maintenance, including care, dismantling, cleaning, painting, and adjustment of parts. |    |
| (3) Railway cars.   | 10 |
| (a) Nomenclature, care, and operation of trucks, hand brakes, air brakes, couplers, and draft gear.       |    |
| (b) Preparation of materiel for movement.   |    |
| (c) Use of narrow or standard gage equipment.   |    |
| (4) Ability as an instructor.   | 10 |
| (5) Organization of a position.   | 5  |
| (a) Camouflage and camouflage discipline.   |    |
| (b) Protection against raids, sabotage, and low-flying aircraft.  |    |
| (c) Cover and the construction of shelter.  |    |
| (6) Ammunition.   | 10 |
| (a) Storage and care.   |    |
| (b) Preparation of powder charges for firing.   |    |
| (c) Preparation of projectiles for firing.  |    |

|   |           |
|---|-----------|
| (d) Safety precautions.   |           |
| (7) Preparations for subcaliber and service practice, including safety precautions.   | 10        |
| (8) Pointing.   | 15        |
| (a) Methods of pointing and pointing tests.   |           |
| (b) Boresighting and orientation.   |           |
| (c) Adjustment of sights and aiming rule (practical).   |           |
| (9) Map reading.  | 15        |
| (a) Scales, contours, and conventional signs.   |           |
| (b) Location of a position by coordinates.  |           |
|   | <hr/> 100 |
| <b>e. Duties of railway sergeant.</b>   |           |
| (1) Railway cars.   | 25        |
| (a) Detailed knowledge of the functioning of the several parts.   |           |
| (b) Inspection of materiel, including journal boxes, couplings, air brakes, centrifugal dirt collectors, hand brakes, brake shoes, and wheels.  |           |
| (c) Maintenance of materiel, including adjustment, minor repairs, replacements, and packing journal boxes.  |           |
| (2) Railway movements.  | 20        |
| (a) Practical understanding of manuals, orders, and regulations on car operation.   |           |
| (b) Duties of train conductor, including arrangements for guards in personnel cars and on all open cars loaded with materiel; information relative to weights, contents, clearances, classes, and numbers of cars in train. |           |
| (c) Safety precautions for personnel during movements.  |           |
| (3) Track construction, including practical knowledge of track and spur construction.   | 20        |
| (4) Practical knowledge of loading and unloading cars.  | 10        |
| (5) Make-up of trains for approaching combat battery positions; precautions to avoid unnecessary travel and switching in placing various cars in position.  | 15        |
| (6) Ability as an instructor.   | 10        |
|   | <hr/> 100 |

## Part 2—Automatic Weapons Section

35. GENERAL. See paragraph 20.

**36. SECOND-CLASS GUNNER AND FIRST-CLASS GUNNER.** These examinations will be the same as the examinations prescribed for the principal arm except that automatic weapons will be covered in detail and the primary armament in general.

**37. EXPERT GUNNER.** See paragraph 34.

## Section VI. SEARCHLIGHT BATTERIES, HARBOR DEFENSE

### Part 1—Seacoast Platoons

**38. SECOND-CLASS GUNNER.** Candidates for second-class gunner will be examined on the following subjects:

**a. Light drill.** Candidates will be required to perform the duties of such members of the searchlight section as the board may direct. 30

**b. Nomenclature of light, power plant, and control system.** 30

**c. Cordage and mechanical maneuvers.** 10

**d. Small arms.** This will include all small arms issued to the battery. 15

(1) Nomenclature.

(2) Use, care, and adjustment.

(3) Ammunition.

(4) Safety precautions.

**e. Recognition of aerial and water targets.** 15

100

**39. FIRST-CLASS GUNNER.**

**a. Care and operation of power plant.** 15

**b. Care and operation of searchlight.** 15

**c. Care and operation of control system.** This will include a general knowledge of radar if used in connection with the light. 10

**d. Use and care of telephones or radio.** 10

(1) Sending, receiving, and recording messages. (Voice only for radio.)

(2) Installation, use, and tests of field telephone systems.

**e. Motor transportation.** 10

(1) Duties of driver in operation and maintenance of motor vehicles.

|  |           |
|--|-----------|
| (2) Trouble shooting and minor repairs.                                |           |
| (3) Convoy rules and discipline.                                       |           |
| (4) Handling trucks under adverse conditions.                          |           |
| <b>f. Elementary definitions pertaining to seacoast artillery.</b>     | 10        |
| <b>g. Use, orientation, and adjustment of observation instruments.</b> | 10        |
| <b>h. Tactical organization of harbor defense.</b>                     | 10        |
| <b>i. Basic map reading.</b>   | 10        |
|  | <hr/> 100 |

**40. EXPERT GUNNER.** Candidates for expert gunner will be required to take one of four examinations listed below:

**a. Duties of chief of section.**

|  |    |
|--|----|
| (1) Definitions and elementary principles of seacoast artillery.                 | 10 |
| (2) Searchlight apparatus, power plant, and control apparatus.                   | 25 |
| (a) Detailed knowledge of the functioning of parts.                              |    |
| (b) Inspection, care, cleaning, and adjustment of parts.                         |    |
| (3) Recognition of aerial and water targets.                                     | 15 |
| (4) Knowledge of local waters, channels, landmarks, and shipping.                | 10 |
| (5) Elementary principles of electricity and magnetism.                          | 10 |
| (6) Ability as an instructor.  | 10 |
| (7) Orientation and use of observation instruments; ability to act as a spotter. | 10 |
| (8) Organization of a position.  | 10 |
| (a) Camouflage and camouflage discipline.  |    |
| (b) Protection against raids, sabotage, and low-flying aircraft.                 |    |
| (c) Cover and the construction of shelter.                                       |    |

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100

**b. Duties of communication sergeant for 155-mm and railway batteries.** See paragraph 28d.

**c. Duties of communication sergeant, harbor defense.** See paragraph 19d.

**d. Duties of transportation sergeant.** See paragraph 28e.



## Part 2—Antiaircraft platoons

**41. SECOND-CLASS GUNNER.** Candidates for second-class gunner will be examined on the following subjects:

**a. Light drill.** This will include drill on the materiel, 30 during which candidates will be required to perform the duties of such members of the section as the board may direct.

**b. Nomenclature of light, power plant, and control 30 section; also of sound locator if used in the battery.**

**c. Small arms.** This will cover small arms issued to the 15 battery.

(1) Nomenclature.

(2) Use, care, and adjustment.

(3) Ammunition.

(4) Safety precautions.

**d. Cordage and mechanical maneuvers.** 10

**e. Recognition of aerial and water targets.** 15

100

**42. FIRST-CLASS GUNNER.** Candidates for first-class gunner will be examined on the following subjects:

**a. Care and operation of power plant.** 15

**b. Care and operation of searchlight.** 15

**c. Care and operation of control system.** General 10 knowledge of the use of radar will be required if it is employed by the battery.

**d. Use and care of telephones or radio.** 10

(1) Sending, receiving, and recording of messages. (Voice only for radio.)

(2) Installation, use, and tests of field telephone systems.

**e. Elementary definitions pertaining to antiaircraft artillery searchlight operations.** 10

**f. Motor transportation.** 20

(1) Duties of the driver in first echelon maintenance.

(2) Trouble shooting and minor repairs.

(3) Convoy rules and discipline.

(4) Handling of motor vehicles under adverse conditions.

**g. Tactical organization of harbor defense.** 10

**h. Basic map reading.** 10

100

**43. EXPERT GUNNER.** Candidates for expert gunner will be required to take one of the four examinations listed below:

**a. Duties of chief of section.**

(1) Definitions and elementary principles of antiaircraft artillery searchlight operations. 10

(2) Searchlight apparatus. 25

(a) Detailed knowledge of the functioning of the several parts.

(b) Inspection, maintenance, care, cleaning, and adjustment of the several parts.

(c) Loading, unloading, and transportation of the equipment.

(3) Elementary principles of electricity and magnetism. 15

(4) Organization of a position. 10

(a) Camouflage and camouflage discipline.

(b) Protection against raids, sabotage, and low-flying aircraft.

(c) Cover and the construction of shelter.

(5) Recognition of aerial and water targets. 15

(6) Ability as an instructor. 10

(7) Map reading. 15

(a) Scales, contours, and conventional signs.

(b) Coordinates.

(c) Ability to follow a route on the map.

---

100

**b. Duties of communication sergeant, harbor defense.**  
See paragraph 19d.

**c. Duties of communication sergeant, 155-mm and railway batteries.** See paragraph 28d.

**d. Duties of transportation sergeant.** See paragraph 28e.

## Section VII. ANTIMOTOR TORPEDO BOAT AND ANTIAIRCRAFT ARTILLERY GUN BATTERIES

### Part 1—Primary Armament

#### Batteries with a primary seacoast mission

**44. SECOND-CLASS GUNNER.** Candidates for second-class gunner will be examined on the following subjects:

**a. Service of the piece.** Candidates will be required, 30  
during actual drill, to perform the duties of such members  
of the gun section as the board may direct.

**b. Gun and mount.** The steps in this part of the ex- 30  
amination will include the testing of the candidates'  
general knowledge of automatic weapons of .50 caliber or  
greater, if such weapons are issued to or manned by the  
battery.

(1) Nomenclature.

(2) Functioning of the parts.

(3) Care and minor adjustments.

(4) Painting and the use of lubricants.

(5) Safety precautions.

**c. Ammunition.** 15

(1) Preparation for firing.

(2) Safety precautions in storing and handling.

**d. Small arms.** This will cover small arms of .45 caliber 15  
or smaller.

(1) Nomenclature.

(2) Use, care, and adjustment.

(3) Ammunition.

(4) Safety precautions.

**e. Cordage and mechanical maneuvers.** 10  
100

**45. FIRST-CLASS GUNNER.** Candidates for first-class gun-  
ner will be examined on the following subjects:

**a. Duties of the range section.** Candidates will be 20  
required, during actual drill, to explain and perform the  
duties of such members of the range section as the board  
may direct.

**b. Fire-control instruments (general knowledge).** 15

(1) Practical operation and use in fire control.

(2) Orientation.

(3) Minor adjustments.

(4) Data transmission system.

**c. Elementary knowledge of radar and its use in 10  
fire-control system of the battery.**

**d. Basic map reading.** 10

**e. Use and care of telephones or radio.** 15

|  |           |
|--|-----------|
| (1) Sending, receiving, and recording of messages. (Voice only for radio.) |           |
| (2) Installation, use, and tests of field telephone systems.               |           |
| <b>f. Definitions pertaining to seacoast artillery.</b>                    | 10        |
| <b>g. Tactical organization of the harbor defense.</b>                     | 10        |
| <b>h. Recognition of water targets.</b>                                    | 10        |
|  | <hr/> 100 |

**46. EXPERT GUNNER.** Candidates for expert gunner will be required to take one of the four following examinations:

**a. Duties of chief of section and gun commander.**

(1) Definitions and elementary principles of seacoast artillery. 10

(2) Gun and mount. 20

(a) Detailed knowledge of the functioning of the several parts.

(b) Inspection and maintenance, including dismantling, care, cleaning, painting, packing, and adjustment of the several parts.

(c) Operation and care of the data transmission system.

(d) Orientation and synchronization.

(3) Ability as an instructor. 10

(4) Organization of a position. 10

(a) Camouflage and camouflage discipline.

(b) Protection against raids, sabotage, and low-flying aircraft.

(c) Cover and the construction of shelter.

(5) Ammunition. 10

(a) Care and storage.

(b) Safety precautions.

(6) Preparation for service firing. 15

(7) Pointing. 15

(a) Methods of pointing.

(b) Methods of firing.

(c) Boresighting and orientation.

(d) Alternate methods of fire control.

(8) Map reading. 10

(a) Scales, contours, and conventional signs.

(b) Coordinates.

(c) Ability to follow routes indicated on a map.

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**b. Duties of chief of range section.**

- (1) Definitions and elementary principles of seacoast artillery. 10
- (2) Position finding. 20
- (a) Systems and theory.
- (b) Detailed knowledge of the system in use in the battery.
- (c) Alternate systems.
- (3) Detailed knowledge of the adjustment, care, and operation of all position-finding apparatus in use in the battery, including a knowledge of the use and operation of radar if used by the battery. 25
- (4) Ability as an instructor. 10
- (5) Elementary gunnery. 20
- (a) Explanation of the several corrections applied to range and deflection to obtain final firing data.
- (b) Interpretation and application of the meteorological message.
- (c) Purpose and conduct of trial, calibration, and verification fire.
- (d) Computation and application of corrections based on trial fire.
- (6) Spotting and fire adjustment. 15
- (a) Systems and theory.
- (b) Detailed knowledge of the systems in use in the battery.
- (c) Alternate methods.

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**c. Duties of communication sergeant.** See paragraph 19d.

**d. Duties of observer.** See paragraph 19c.

**Batteries with a primary antiaircraft mission**

**47. SECOND-CLASS GUNNER.** Candidates for second-class gunner will be examined on the following subjects:

**a. Service of the piece.** Candidates will be required, during actual drill, to perform the duties of such members of the gun section as the board may direct. 30

**b. Gun and mount.** The steps in this part of the examination will include the testing of the candidates' 30

general knowledge of automatic weapons of .50 caliber or greater issued to or manned by the battery.

- (1) Nomenclature.
- (2) Functioning of the parts.
- (3) Care and minor adjustments.
- (4) Painting and the use of lubricants.
- (5) Safety precautions.

**c. Ammunition.**

15

- (1) Preparation for firing.
- (2) Safety precautions in storing and handling.

**d. Small arms.** This will cover small arms of .45 caliber or smaller issued to the battery. 15

- (1) Nomenclature.
- (2) Use, care, and adjustment.
- (3) Ammunition.
- (4) Safety precautions.

**e. Cordage and mechanical maneuvers.**

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**48. FIRST-CLASS GUNNER.** Candidates for first-class gunner will be examined on the following subjects:

**a. Duties of range section.** Candidates will be required, during actual drill, to perform the duties of such members of the range section as the board may direct. 20

**b. Fire control instruments (general knowledge).** 15

- (1) Use and minor adjustments.
- (2) Orientation.

**c. Elementary knowledge of radar and its use in fire-control system of the battery.** 10

**d. Recognition of aerial targets.** 10

**e. Elementary definitions pertaining to antiaircraft artillery.** 10

**f. Use and care of telephones or radio.** 15

- (1) Sending, receiving, and recording of messages. (Voice only for radio.)
- (2) Installation, use, and tests of field telephone systems.
- (3) Minor repairs.

**g. Tactical organization of the harbor defense.** 10

**h. Basic map reading.** 10

100

**49. EXPERT GUNNER.** Candidates for expert gunner will be required to take one of the four following examinations:

**a. Duties of chief of section and gun commander.**

(1) Definitions and elementary principles of antiaircraft artillery. 10

(2) Gun and mount. 20

(a) Detailed knowledge of the functioning of parts.

(b) Inspection and maintenance, including care, dismantling, cleaning, painting, and adjustment of parts.

(c) Safety precautions.

(3) Ammunition. 10

(a) Storage and care.

(b) Fuzing and preparation for firing.

(c) Safety precautions.

(4) Ability as an instructor. 10

(5) Preparation for service firing. 15

(6) Map reading. 10

(7) Pointing. 15

(a) Boresighting and orientation.

(b) Operation and care of the data transmission system.

(c) Synchronization.

(d) Alternate methods.

(8) Organization of a position. 10

(a) Camouflage and camouflage discipline.

(b) Protection against local raids, sabotage, and low-flying aircraft.

(c) Cover and the construction of shelter.

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**b. Duties of chief of range section.**

(1) Definitions and elementary principles for antiaircraft artillery. 10

(2) Position-finding systems. 20

(a) Detailed knowledge of the system used in the battery.

(b) Alternate systems.

(c) Care, use, and adjustment of position-finding apparatus.

(3) Ability as an instructor. 10

(4) Elementary gunnery. 25

(a) Explanation of the several corrections necessary to obtain final firing data.

(b) Effects of variations in the meteorological conditions.

(c) Purpose of trial, calibration, and verification fire.

(d) Computation of corrections based on trial fire.

(e) Application and interpretation of the meteorological message.

(5) Methods of observation of fire and how to apply corrections, including a general knowledge of the use of radar. 15

(6) Recognition of aircraft. 10

(7) Records and preparation of target practice reports. 10  
100

c. **Duties of observer.** See paragraph 19c.

d. **Duties of communication sergeant.** See paragraph 19d.

## Part 2—Automatic Weapons Section

50. **GENERAL.** See paragraph 20.

51. **FIRST-CLASS GUNNER AND SECOND-CLASS GUNNER.** These examinations will be the same as the examinations prescribed for the principal arm except that the automatic weapons will be covered in detail and the primary armament in general.

52. **EXPERT GUNNER.** See paragraph 49.

## Section VIII. MINE PLANTER BATTERIES

53. **SECOND-CLASS GUNNER.** Candidates for second-class gunner will be examined on the following subjects:

a. **Seamanship.** Candidates must possess a lifeboat ticket or knowledge equivalent to that required for a lifeboat ticket. 20

b. **Marlinspike seamanship (practical).** Knots, cordage, cables, and rope and cable splicing. 15

c. **Painting.** 10

(1) Types of paints, lacquers, and varnishes.

(2) Tools used in painting.



|   |           |
|---|-----------|
| (3) Painting techniques and methods.  |           |
| <b>d. Characteristics of mine planter.</b>  | 5         |
| (1) Knowledge of and ability to operate deck machinery.                           |           |
| (2) Physical dimensions of the vessel; its type, nomenclature, and limitations.   |           |
| <b>e. Station positions.</b>  | 15        |
| (1) Detailed knowledge of the duties of the candidates' stations during an alert. |           |
| (2) Fire and emergency station and duties.  |           |
| (3) Abandon ship station and duties.  |           |
| (4) Fire-fighting methods.  |           |
| <b>f. Small arms.</b> This will cover all small arms.                             | 15        |
| (1) Nomenclature.   |           |
| (2) Care, operation, and use.   |           |
| (3) Ammunition.   |           |
| (4) Safety precautions.   |           |
| <b>g. Duties of a lookout; reporting of objects sighted.</b>                      | 10        |
| <b>h. Handling of lead line; taking soundings.</b>                                | 5         |
| <b>i. General organization and responsibilities aboard planter.</b>               | 5         |
|   | <hr/> 100 |

**54. FIRST-CLASS GUNNER.** Candidates for first-class gunner will be examined on the following subjects:

|  |    |
|--|----|
| <b>a. Duties on deck.</b>  |    |
| (1) Seamanship. Candidates must possess an able-bodied seaman's certificate or knowledge equivalent to that required for this certificate.                               | 25 |
| (2) Duties of a deck hand.   | 20 |
| (a) General knowledge of and maintenance of deck equipment.  |    |
| (b) Knowledge of the type, use, and operation of the ground tackle of the planter.   |    |
| (c) Hoisting and weighing of anchors.  |    |
| (3) Marlinspike seamanship, including practical proficiency in cable splicing and a knowledge of the capacity of the various lines, cleats, and stoppers on the planter. | 15 |
| (4) Antiaircraft machine guns.   | 20 |
| (a) Nomenclature.  |    |
| (b) Adjustment, functioning, and use.  |    |
| (c) Ammunition.  |    |

|   |           |
|---|-----------|
| (d) Safety precautions.   | 10        |
| (5) Use of the oxygen breathing apparatus.  | 10        |
| (6) Visual signaling (semaphore).   | 10        |
|   | <hr/> 100 |
| <b>b. Duties of quartermaster.</b> Candidates will take the examination in paragraph 54a except for the following substitution for paragraph 54a (2): |           |
| (2) Pilot house.  | 20        |
| (a) Elementary navigation.  |           |
| (b) Elementary duties of a wheelman.  |           |
| (c) Pilot house equipment.  |           |
| (d) Rules of the road.  |           |
| <b>c. Duties of deck engineer and oilers.</b>   |           |
| (1) Fireroom.   | 15        |
| (a) Practical operation.  |           |
| (b) Combustion control.   |           |
| (c) Feed water treatment.   |           |
| (d) Boilers and feed mechanisms.  |           |
| (e) Fuel oils.  |           |
| (2) Possession of a fireman's ticket or knowledge equivalent to that required for this ticket.  | 15        |
| (3) Engine room.  | 20        |
| (a) Nomenclature of engine-room equipment.  |           |
| (b) Functioning of the equipment of the engine room.  |           |
| (c) Safety precautions.   |           |
| (4) Ability to handle the throttles; nomenclature of the speed-control mechanisms; method of transmitting data from the bridge.                       | 15        |
| (5) Use of the oxygen breathing apparatus.  | 10        |
| (6) Keeping of a logbook.   | 5         |
| (7) Responsibilities while on watch.  | 10        |
| (8) Elementary knowledge of the operation and maintenance of deck gear.   | 10        |
|   | <hr/> 100 |

**55. EXPERT GUNNER.** Candidates for expert gunner will be required to take one of the five following examinations:

**a. Duties of chief oiler.**

(1) Possession of an oiler's ticket or knowledge equivalent to that required for this ticket. 25

(2) Engine room. Detailed knowledge of the engine room and all apparatus including pumps, boilers, valves, valve settings, and gages; ability to gage temperatures by feeling. 30

(3) Detailed knowledge of the instrument panel. 15

(4) Detailed knowledge of paints and painting in engine room. 10

(5) Ability as an instructor. 10

(6) Types and use of lubricants. 10

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**b. Duties of chief quartermaster.**

(1) Ability to steer the planter. 15

(2) Signaling. 15

(a) International flag hoists.

(b) Panels.

(c) Blinker.

(d) Semaphore.

(e) Pyrotechnics.

(3) Ability to keep the ship's log. 10

(4) Navigation. 25

(a) Detailed knowledge of the rules of the road.

(b) Navigation aids, including buoys, spars, channel markers, lighthouses, fog signals, storm signals, and distance signals.

(c) General knowledge of charts and bridge publications.

(5) Bridge equipment. 15

(a) Detailed knowledge of the ship's compass.

(b) General knowledge of the function and stowage of bridge equipment.

(6) Definitions and elementary principles of mine planting. 10

(7) Ability as an instructor. 10

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**c. Duties of deck engineer.**

(1) Elementary principles of electricity and magnetism. 15

(2) Detailed knowledge of the type, operation, use, and maintenance of all deck gear. 25

(3) Trouble shooting and minor repairs of deck machinery. 15

|   |            |
|---|------------|
| (4) Lubricants for and lubrication of all deck machinery.                           | 10         |
| (5) Detailed knowledge of the functioning, care, and adjustment of AA machine guns. | 15         |
| (6) Ability as an instructor.   | 10         |
| (7) Responsibilities while on watch.  | 10         |
|   | <u>100</u> |

**d. Duties of boatswain's mate and storekeeper.**

|   |            |
|---|------------|
| (1) Detailed knowledge of the use of all deck gear and machinery including capacities.  | 20         |
| (2) Detailed knowledge of the responsibilities of the boatswain's mate in painting and in the maintenance of that portion of the planter assigned to the boatswain. | 10         |
| (3) Detailed knowledge of paints, varnishes, and lacquers.  | 5          |
| (4) Detailed knowledge of the use, functioning, adjustment, and maintenance of AA machine guns.   | 10         |
| (5) Ability as an instructor.   | 10         |
| (6) Detailed knowledge of lifeboats and lifeboat equipment.   | 10         |
| (7) Knowledge of the handling of lines in docking and in leaving piers.   | 10         |
| (8) Ability to run a deck watch.  | 5          |
| (9) Knowledge of the proper methods for stowing equipment for sea.  | 5          |
| (10) Mine-planting methods.   | 15         |
|   | <u>100</u> |

**e. Duties of chief radio operator.**

|  |    |
|--|----|
| (1) Principles of electricity, magnetism, and radio.           | 15 |
| (2) Radio equipment on the planter.                            | 25 |
| (a) Installation.  |    |
| (b) Trouble shooting and repairs.                              |    |
| (c) Practical operation. (Voice and International Morse Code.) |    |
| (3) Visual signaling.  | 10 |
| (a) Semaphore.   |    |
| (b) Blinkers.  |    |
| (c) International flag hoists.                                 |    |
| (d) Pyrotechnics.  |    |
| (e) Panels.  |    |

|   |            |
|---|------------|
| (4) Use, adjustment, and maintenance of public address systems. | 10         |
| (5) Duties and operations in emergencies.                       | 10         |
| (6) Ability as an instructor.                                   | 10         |
| (7) Joint Army-Navy signal procedure.                           | 10         |
| (8) Maintenance of the ship's telephone system.                 | 10         |
|   | <u>100</u> |

## Section IX. HEADQUARTERS BATTERIES OR DETACHMENTS OF ALL COMMANDS

**56. GENERAL.** Members of all headquarters batteries or detachments will take those examinations, prescribed for other units of the command, which most nearly cover their duties. The examinations will be selected by the battery commander and approved by the next higher authority.